offense committed, if not heard then let a committee inform the Governor of their methods, and I am sure we will get action or a new board.

If the Board of Examiners is not a paying organization, then why have it? Why not do away with it and invest the State Board of Health with the power to examine candidates wishing to obtain a license in this state? In this way we might become economical enough to create a fund to prosecute these cases with, or if the present board will demonstrate to us that they are willing to perform this duty and the funds are not sufficient, which they receive for this work, then I am willing to donate my part to create a protective fund. But, gentlemen, I am going to be hard to convince that it takes seven or eight thousand dollars annually to pass on the candidates coming before this board.

Now if you, gentlemen, find this matter of sufficient importance to be worthy of any consideration whatever, then let us as representatives of the medical profession see that the principal purpose of the medical act is satisfied.

A CASE OF TUMOR OF THE MEDULLA OBLONGATA.*

By L. NEWMARK, M. D., and MILTON B. LENNON, M. D., San Francisco.

In August, 1906, Dr. W. F. Cheney first gave one of us an opportunity to examine the patient, a boy sixteen years old. At that time the boy declared that he had no pain at all, and indeed he appeared quite at ease and was even inclined to be merry. He staggered when walking, had a cerebellar gait, lurched frequently to the right, and there was a decided ataxic fling of the right foot. But of these disturbances, when they were adverted to, he professed to be unconscious.

There was marked nystagmus when he looked in any direction; it was most pronounced when he looked to the left. There was no paresis of any of the ocular muscles. The vessels of the optic discs were full, but there was no decided papillitis at the time. (The boy observed that he could not see well after dark.) The soft palate was not raised well when he said "Ah," but the left side was raised more than the right. At times he had had difficulty in swallowing, but at this time he had no complaint in that respect. There were no other disturbances in the functions of motor or sensory cranial nerves. (There is no note regarding the sense of taste.)

The movements of the right hand were plainly ataxic; the sense of position of the fingers was defective and there was astereognosis. The functions of the left hand were normal. Motor power in the right hand was not distinctly diminished. Nor was it in either of the lower extremities. The ataxia of the right foot when walking has already been mentioned; but when he touched either knee with the opposite heel or described a circle in the air with either foot, while recumbent, no inco-ordination appeared. The sense of passive movement or posture in the big toe was normally keen on the right as well as on the left.

Sensibility in its other modes was unimpaired in the lower extremities, except that the right sole was a little more ticklish than the left. To stroking of the sole there was a somewhat livelier flexor response in the right foot than in the left. The ankle-jerks and knee-jerks were normal on both sides; also the abdominal and cremasteric reflexes.

Concerning the condition of the patient before this time it was ascertained that he was seized with vomiting towards the end of April, 1906. He rapidly lost in weight, as much as 30 pounds, so that in the absence of symptoms indicating a lesion in the central nervous system a competent observer suspected that the disease was tuberculosis. In May, 1906, he was examined by Dr. Hewlett, whose notes contained the same symptoms as those described in the foregoing, and furthermore an intense optic neuritis (observed by Dr. Barkan). There was some difficulty in swallowing and occasional fronto-occipital headaches.

A note on September 18, 1906, says that the patient's condition was unchanged and that he felt very well. A suspicion of atrophy in the right side of the tongue was not confirmed in the note of October 23d. The preceding week the patient had had some difficulty in swallowing food while in bed (to which he had been confined by a cold). The left side of the soft palate acted decidedly better than the right. There was again a well-marked papillitis; the edges of the discs had become decidedly swollen during the past week.

On this day the boy walked several blocks in the company of one of us. The cerebellar lurching and the ataxia of the right leg were commented upon during this walk, but the patient seemed not at all disturbed by them and declared that he felt "fine."

He appeared to be as usual on October 24th and 25th and on the morning of October 26th occupied himself in chopping kindling wood. About 2 in the afternoon he had a headache and vomited his food; after resting for a few minutes he asked again for food, but before he could get it the vomiting was renewed and he died about fifteen minutes after he had begun to feel ill.

On October 27th Professor Ophüls removed the brain, and kindly relinquished the specimen to us. It was fixed in formaldehyde and after that in bichromate of potash, and, after hardening in alcohol, the blocks were embedded in celloidin and sections cut as far as possible perpendicularly to the long axis of the pons and medulla oblongata.

As for the gross appearance of the specimen, it may suffice to say that the medulla oblongata was transformed by a tumor into a spherical body; the tumor projected chiefly out of the right half of the medulla. A section through the middle of the pons discloses a tumor in the fourth ventricle, the roof of which had given way.

The microscopic sections were mostly stained by a modification of Weigert's method for the myeline

* From the Neuro-Pathological Laboratory of the San Francisco Polyclinic.

sheaths; some were stained by Von Gieson's method and others with hematoxylin and eosin.

In sections through the posterior part of the posterior corpora quadrigemina, at the level of the trochlear nerve, except for some dilation of the fourth ventricle conditions are normal. The superior cerebellar peduncles are observed here shifting ventralwards and towards the median line on the way to their decussation further forwards. Sections through the pons and cerebellum, beginning at the level of the emergence of the fifth nerve, show a tumor lying in the fourth ventricle. The tumor in the upper sections is situated in the right half of the ventricle. It becomes gradually larger as we descend, extending across the middle line. It is free in the ventricle until the level of the sixth nerve is reached, where it is seen to project from the floor of the ventricle a little to the right of the middle line.

The superior cerebellar peduncles at these levels are misshapen, compressed and pushed far apart. A mere thread of tissue passes from one to the other, forming all that there is of a roof of the ventricle; in some places even this is wanting. In the pons itself under the floor of the ventricle, except for some asymmetry and signs of compression in and about the median fillet no damage is discernible down to the level of the origin of the abducens nerve. Here, however (where, as already stated, the tumor first appears connected with the floor of the ventricle), a pathological change is revealed in a section stained by Weigert's myelin-sheath stain by a slight pallor in the right half of the pons in the area between the sixth nerve and the middle cerebellar peduncle. This pallor becomes somewhat more distinct a little lower down in a section through the upper medulla oblongata, where the intact seventh nerve traverses the affected area, and soon in the course of our descent most of the nerve fibers between the right olivary body and the right middle peduncle have disappeared.

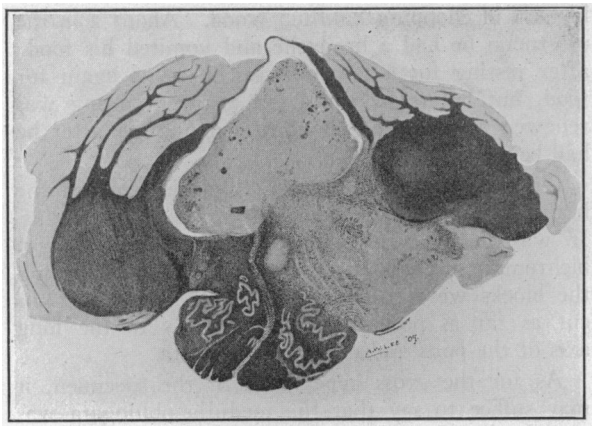

Figure 1.

The Van Gieson stain shows that the growth extends here through the right half of the medulla oblongata from its dorsal to its ventral surface. The intraventricular and intramedullary portions of the tumor increase rapidly in size.

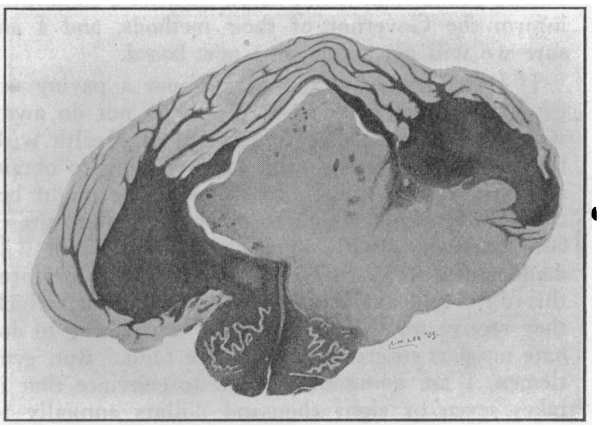

Figure 2.

In the region in the upper half of the olivary body it extends toward the right from the olive to the flocculus; the pyramid and the fillet are spared. It then continues to enlarge laterally, destroying the right corpus restiforme and encroaching upon the right middle peduncle of the cerebellum.

After the medulla oblongata has separated from the cerebellum the tumor is at first confined to the right half of the medulla, but it gradually invades the left half in its dorsal part (Figure 3) and near the lower pole of the olive it occupies the dorsal half of the left side of the medulla oblongata and reaches there laterally almost to the corpus restiforme. Hypoglossus fibers are preserved in the ventral half of the section.

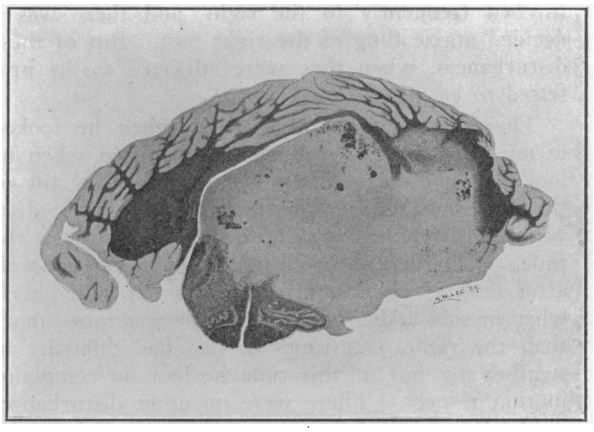

Figure 3.

Sections through the medulla oblongata at, and below, the lower tip of the olive now present roughly the picture of a crescent-shaped medulla formed by both (intact) pyramids and a small amount of normal nerve tissue dorsad of them on either side of the middle line, and by the myelinated tissue at the left periphery situated between the pyramid and the restiforme body. Internal arcuate fibers are preserved on the left. The concavity of this crescent is occupied by a tumor which extends dorsalwards until it fills the space between the corpora dentata of the cerebellum and invades the white cerebellar

substance on the right beyond the dentate body. Figure 3 shows well the relations between cerebellum, medulla oblongata and tumor, which are found also at lower levels than that represented in this illustration: more and more of the medulla is superseded by the tumor until the shape of the former approaches more that of a crescent. It is difficult in parts to get one's bearings on account of the widespread destruction of tissue and the asymmetry of the section. It is about at the level of the calamus scriptorius that the crescent-shape described is most marked. Here we find the pyramids and the fillet preserved on both sides, also some hypoglossus fibers on both sides; further on the left the direct cerebellar tract, the corpus restiforme and the solitary bundle adjoining the tumor, and the internal arcuate fibers descending to the fillet.

A section through the medulla oblongata (and cerebellum) at the sensory decussation exhibits the tumor at its maximum. The relations between medulla, cerebellum and tumor remain the same as shown in Figure 3. The decussation is intact; the internal arcuate fibers form a cup which is occupied by a part of the tumor, and these fibers run into the tumor on the right. The root of the spinal accessory is seen in the left half of the medulla. Beyond this the examination of the medulla could not proceed, as the tumor formed the lower end of the specimen and there was no spinal cord attached to it.

In the cerebellum the growth extends backwards in the lower worm, is triangular in shape and occupies at first the whole of the transverse section of the uvula, and is bounded dorsally by the white matter connecting the two corpora dentata. The tumor in the vermis becomes smaller posteriorily, diminishing in its dorso-ventral dimension. It soon disappears, leaving the dentate bodies and the posterior part of the inferior worm intact.

Professor Ophüls examined our specimens and pronounced the tumor a glio-sarcoma.

It will occasion surprise that so extensive a disease in a part of the nervous system which presides over so important functions should be compatible with life as long as it was in this case and should be so easily borne. Oppenheim, in his Lehrbuch der Nervenkrankheiten, 5th Edition, p. 1036, furnishes the reproduction of a section showing an amazing destruction of fibers of the medulla oblongata by two tubercles. Starr writes in his "Nervous Diseases," p. 578 of the third edition, that he has seen an infiltrating glioma of the medulla oblongata which produced an apparent uniform increase in size of the entire medulla to double its ordinary dimensions, but in which there were absolutely no signs of any disease of either cranial nerves or tracts passing through this important part of the nervous system.

The persistence of nerve fibers within the tumor might be supposed to account for this incongruity between extent of the growth and paucity of symptoms. We have found myelinated fibers within the substance of the tumor, as other observers have done; but they are met with in the marginal areas of the growth and are absent from the central parts. Bielschowsky (*Journal fur Neurologie und Psychologie,* Bd. 7) has found more axis-cylinders with his silver-aldehyde method than the Weigert method showed myelinated fibers, but those were also only in the marginal zone of infiltrating tumors. So histology does not provide the desired explanation.

In the case of Starr's which was just referred to, the symptoms had led to the diagnosis of tumor of the cerebellum. In a case reported by Wiswe in the *Deutsche Zeitschrift für Nervenheilkunde,* Bd. 34, in which the tumor was found at autopsy to be in the medulla oblongata, Oppenheim had supposed it to be in the cerebellum or the cerebello-pontile angle, and this incorrect diagnosis had led to an operation on the cerebellum. Earlier in our case, at a time when the intense optic neuritis existed, one of our predecessors had made the diagnosis of a cerebellar tumor. From these errors it will be seen that tumors of the medulla oblongata may be mistaken for growths in the cerebellum, and as cerebellar growths nowadays indicate an operation, and as a tumor in the medulla oblongata is a *noli-me-tangere,* the distinction has become a matter of practical importance; which it was not, a relatively short time ago.

Our patient had a cerebellar gait; but the peculiar ataxia of the right foot, the astereognosis of the right hand, the disturbance in the innervation of the soft palate and the difficulty in swallowing, besides the subsidence of the papillitis and the patient's subjective condition seemed to us to point rather to the medulla as the primary seat of the disease with secondary impairment of cerebellar functions (through involvement of the peduncles) than to a growth in the cerebellum which produced some of the symptoms by pressure on the medulla oblongata. An operation was therefore not taken into consideration.

TRAUMATIC INJURIES OF THE HEAD.*

By O. D. HAMLIN, M. D., Oakland.

In the study of traumatic injuries of the head, the question of diagnosis or the extent of injury is the first question of importance. An early diagnosis will lead to proper treatment, and it is often difficult to make a correct diagnosis of concussion, compression from fracture, compression from hemorrhage, fracture without compression with or without hemorrhage, laceration of brain tissue or subarachanoidal serous exudate, which follows some cases of head injury, or a combination of two or more of these conditions, where the symptoms of one overlap into the other.

When one of these conditions exists alone, the diagnosis is not so difficult, but it is important to study separately the symptoms of these conditions so that we may know more clearly where one condition overlaps into another. For instance, an injury sufficient to cause a fracture of the skull is nearly always associated with some concussion, especially if the traumatism is received by a fall

* Read before the Pacific Association of Railway Surgeons, August, 1909.